Background and Natural Resources Inventory

General Description

Blue Earth County is located in South-Central Minnesota approximately 75 miles southwest of the Twin Cities. The County is 764 square miles in area and had a population of 55,941 in 2000 according to the U.S. Census. Mankato is the County Seat and largest city in the County with a population 32,427 in 2000. Blue Earth County's most notable features are its rivers, lakes, and productive agricultural land. The Minnesota River forms the Blue Earth County's northern border with Nicollet County. The County contains the confluence of three major rivers: the Le Sueur River, the Watonwan River, and the Blue Earth River. The Blue Earth River joins the Minnesota River at the "bend" in the Minnesota River in Mankato. Map 1 shows the general location of the County.

Physical Characteristics

Natural features, such as lakes and rivers, play a significant role in the County's development patterns, land management and conservation. The Minnesota River forms the County's irregular, northern border. The "bend" in the Minnesota River is confluence of several major river systems. Approximately 99 percent of the County is located within the Minnesota River Basin.

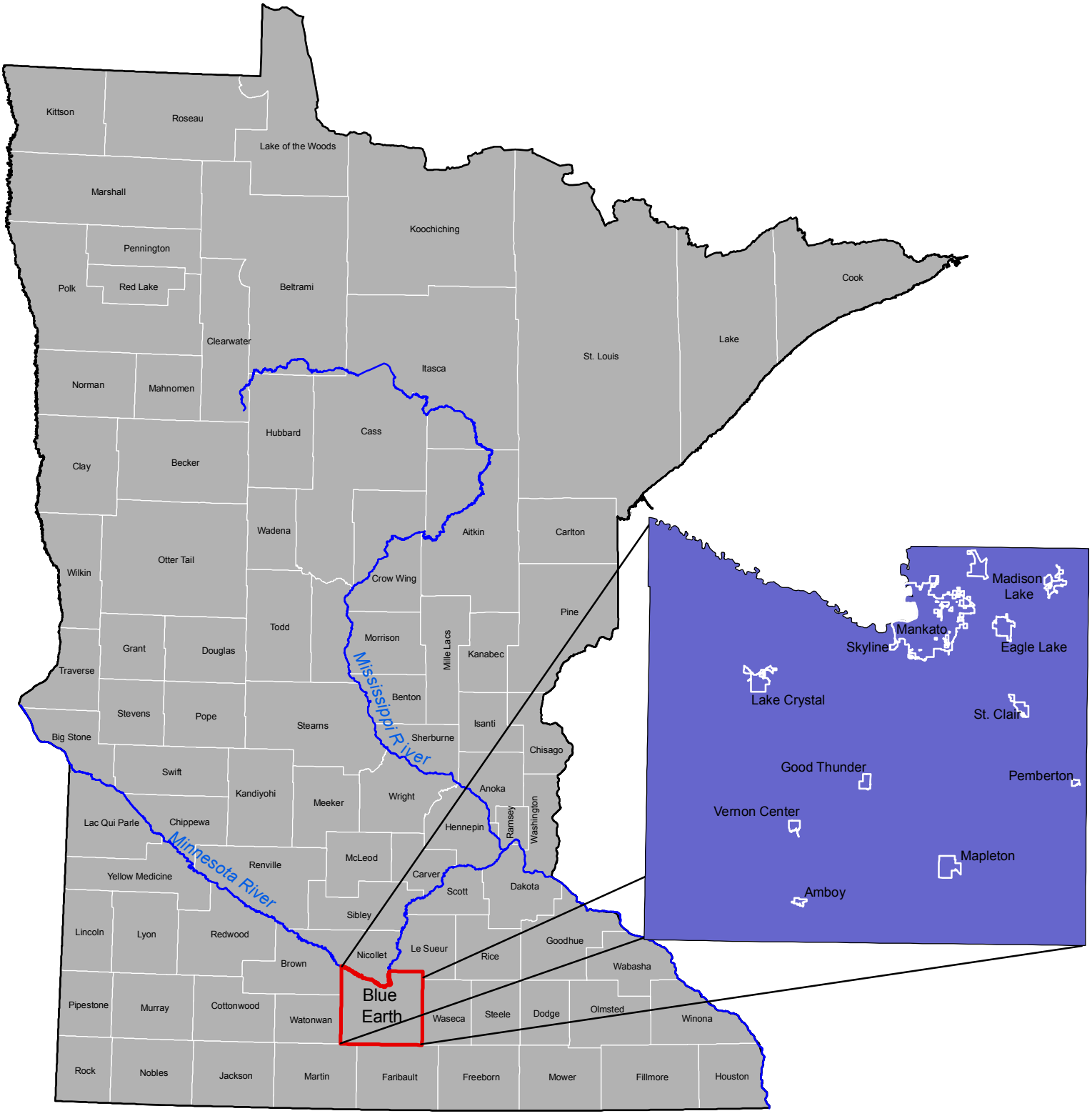
The relief of Blue Earth County is the product of a back-wasting continental glacier. Steep slopes and bluffs are common along the County's many river systems which developed during the retreat of the glacier. Most of the County ranges from nearly level on the lake plain and on ground moraines to rolling where the end moraines form a complex pattern. In areas where there were scattered ice block depressions, a few large lakes formed. There are also many small depressions throughout the County. Secondary drainage in much of the County is immature, and like much of southern Minnesota, the County has an extensive agricultural drainage system of open ditches and subsurface tile lines.

Land Use and Land Cover

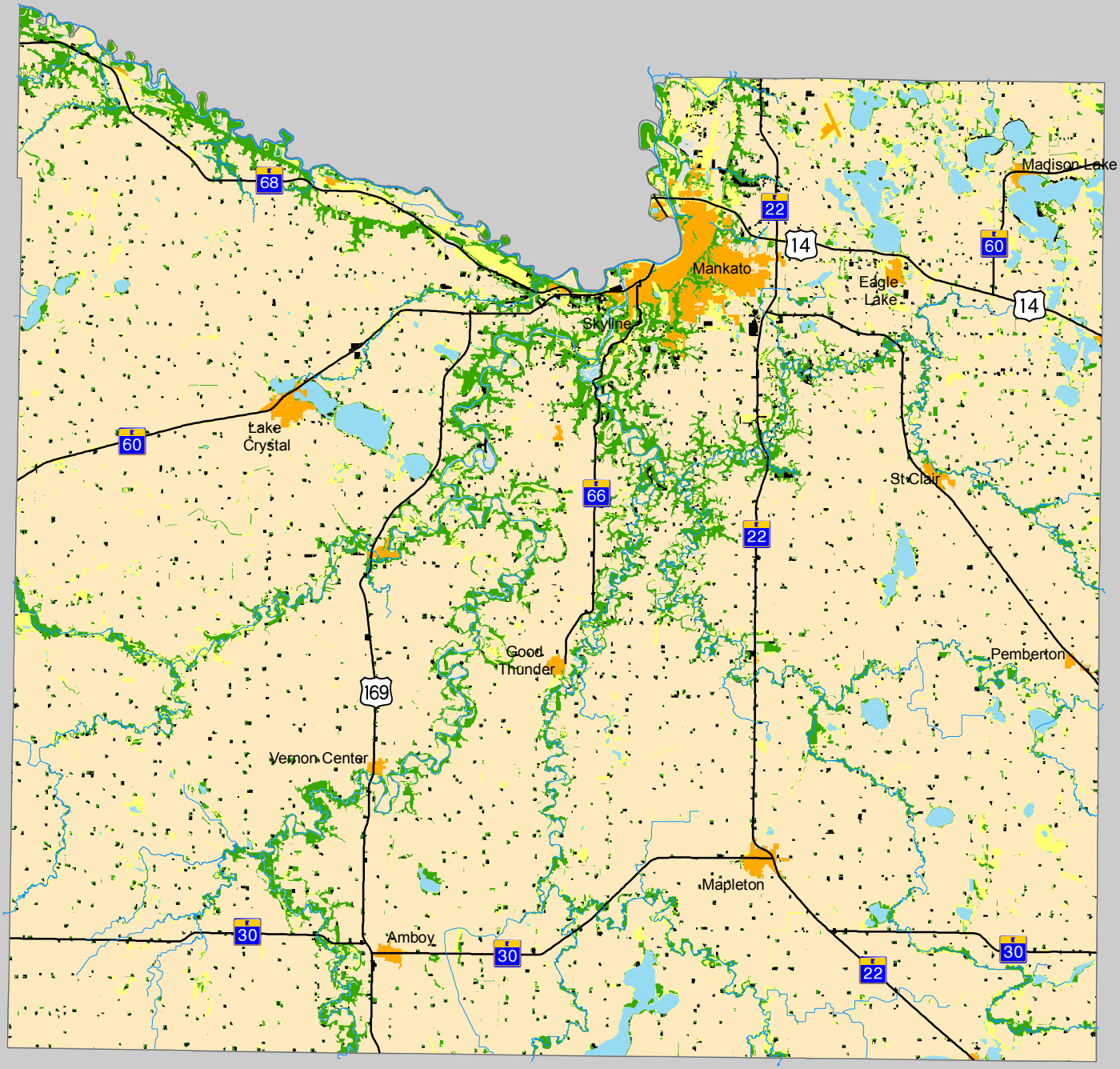
Blue Earth County's landscape is dominated by agricultural uses. Map 2 displays the land use/cover data from the 1990 State Census of Land Use and Cover. Just over 80-percent of the County was cultivated in 1990 according the State's Census of Land Use and Land Cover. Deciduous forests, mostly along the steep slopes adjacent to the rivers, represented just over eight percent of the County. Urban land uses represented just 1.4 percent of the total area of the County in 1990 and farmsteads and rural development represented 1.9 percent of the County's land use. The majority of the rural residential development in the County is scattered along the river bluffs and wooded ravines near Mankato, lakes in the northeast corner and lakes near Lake Crystal. Map 2 displays the land cover data from the 1990 State Census of Land Use and Land Cover.

Although a comprehensive land use analysis in the County has not been done since 1990, observable changes in land use have occurred. Primarily in the municipalities, there has been a great deal of residential, commercial, and industrial growth. Much of this urban growth involves conversion of agricultural land. In 2006, 77 percent of the County was used for cropland. Rural residential growth has slowed as the County's land use policies are aimed at preventing scattered, residential development and preserving agricultural land. Agricultural changes have also occurred since 1990. The animal agriculture industry, primarily hog feedlots, has expanded in Blue Earth County since 1990.

Map 1. General Location - Blue Earth County



Map 2 - 1990 Land Use - Land Cover



1990 Land Use/Cover

- Cultivated Land
- Grassland or Pasture
- Forest
- Urban - Industrial
- Farmsteads or Rural Development
- Gravel Mines or Bare Rock
- Water or Wetland

0 5 Miles

N

BLUE EARTH COUNTY

Prepared By: Blue Earth County
Environmental Services
October 2007

Source: MN Land Use Management Information System's International Coalition Land Use/Land Cover

Watersheds

Over 99 percent of Blue Earth County is located in four major watersheds within the Minnesota River Basin. The Minnesota River Basin's major watersheds are shown in Map 3. The County contains the confluence of the Watonwan River with the Blue Earth River, the confluence of the Le Sueur River with the Blue Earth River, and the confluence of the Blue Earth River with the Minnesota River. Map 4 displays the portions of each watershed in Blue Earth County. The portion of Blue Earth County in each of the four watersheds and the portion of each watershed in Blue Earth County is shown in Table 1.

A significant portion of the Blue Earth River Watershed is located in Martin, Faribault and Jackson County in Minnesota and northern Iowa. Most of the Watonwan River Watershed is located in Watonwan, Cottonwood and Brown Counties. The Le Sueur River Watershed is located in Waseca, Faribault, Freeborn County and Steele County.

At the regional and Minnesota River Basin scale, the Watonwan, Le Sueur and Blue Earth River watersheds are often combined and collectively referred to as the "Greater Blue Earth River Watershed." When combined, the Greater Blue Earth River Watershed covers more than 75 percent of the County's total land area. The remaining area is the Middle Minnesota River Watershed. The Blue Earth River outlet at Mankato separates the Middle Minnesota River Watershed into two sections: the northeast and the northwest corners of the County. The Le Sueur River watershed occupies 48 percent of the County, the greatest amount of land coverage in Blue Earth County. The Le Sueur River watershed contains a number of relatively large tributary streams including the Maple River, Cobb River, Little Cobb River, and Rice Creek.

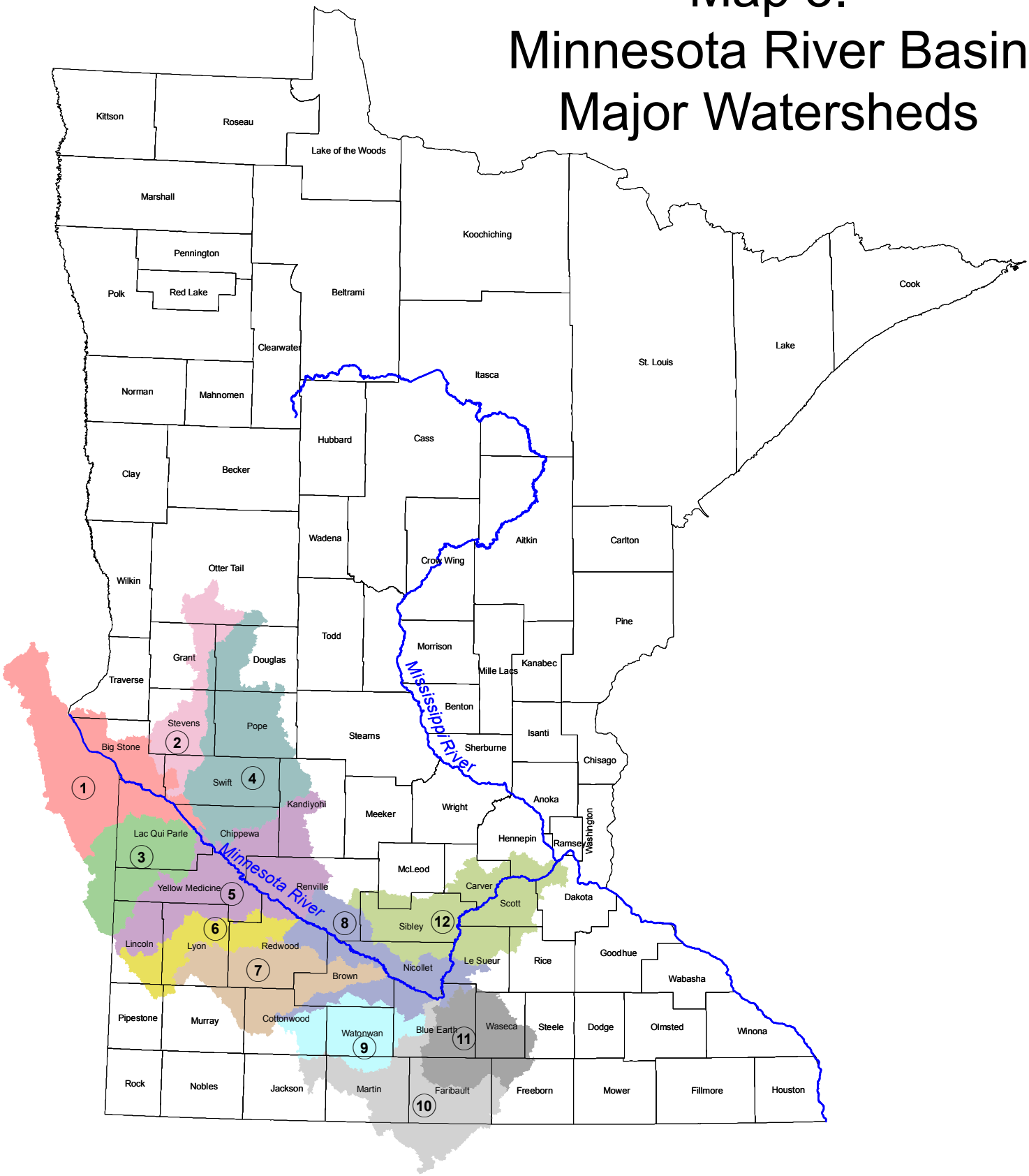
Two-square miles in the northeast corner of the County drains east to the Cannon River watershed.

Table 1. Comparison of Major Watersheds

Source: Blue Earth County Environmental Services Department

Watershed	Total Square Miles	Square Miles in Blue Earth County	Percentage of Watershed in Blue Earth County	Land Coverage In Blue Earth County For Each Watershed
Blue Earth River	1,205	124	10.2%	16.2%
Cannon River	1,482	2	0.1%	0.2%
Le Sueur River	1,078	368	34.1%	48.1%
Middle Minnesota Rive	1,385	178	12.8%	23.3%
Watonwan River	850	93	10.9%	12.2%

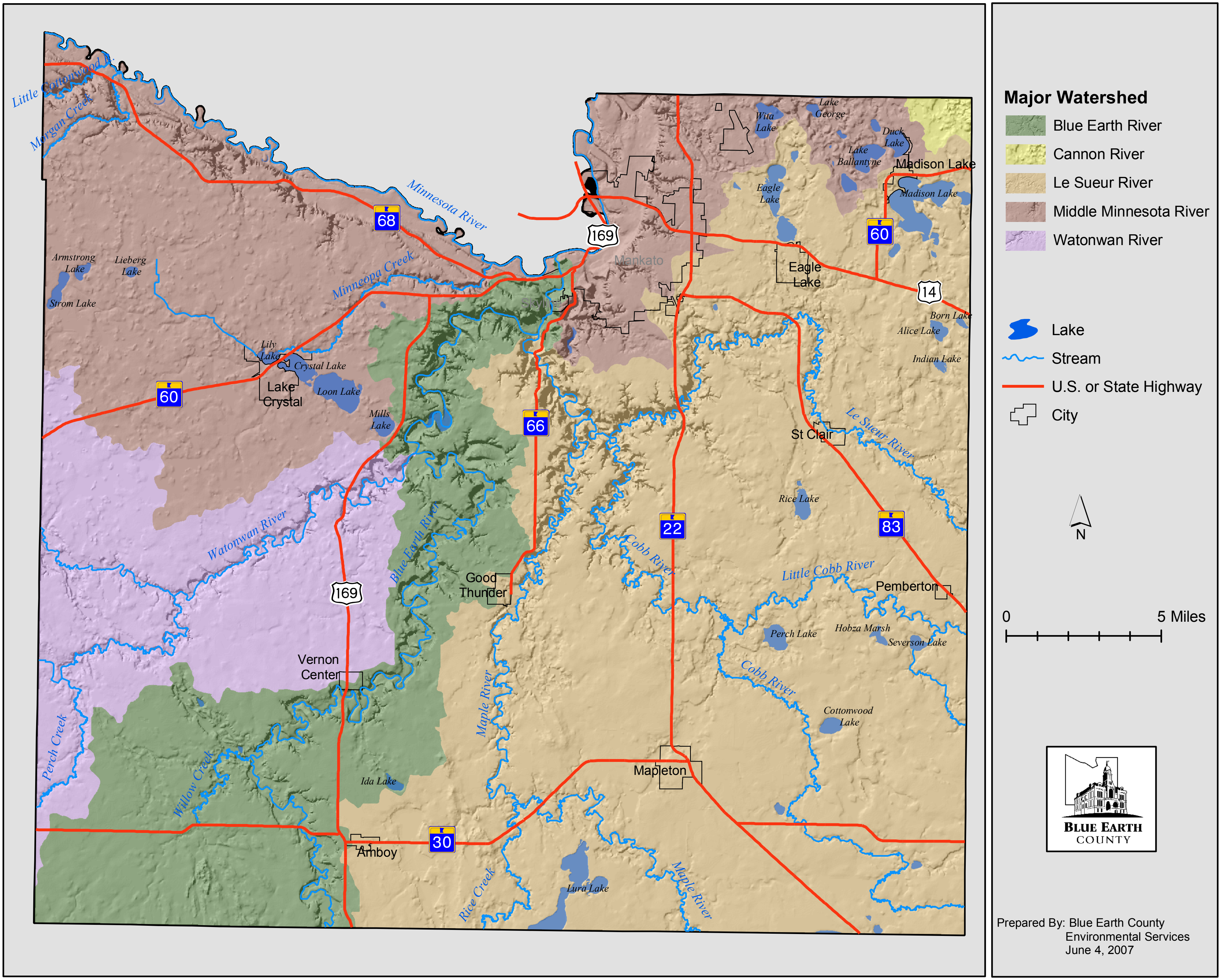
Map 3.
Minnesota River Basin
Major Watersheds



Watersheds in the Minnesota River Basin

1	Upper Minnesota River	5	Hawk Creek - Yellow Medicine River	9	Watonwan River
2	Pomme De Terre River	6	Redwood River	10	Blue Earth River
3	Lac Qui Parle River	7	Cottonwood River	11	Le Sueur River
4	Chippewa River	8	Middle Minnesota River	12	Lower Minnesota River

Map 4. Major Watersheds - Blue Earth County



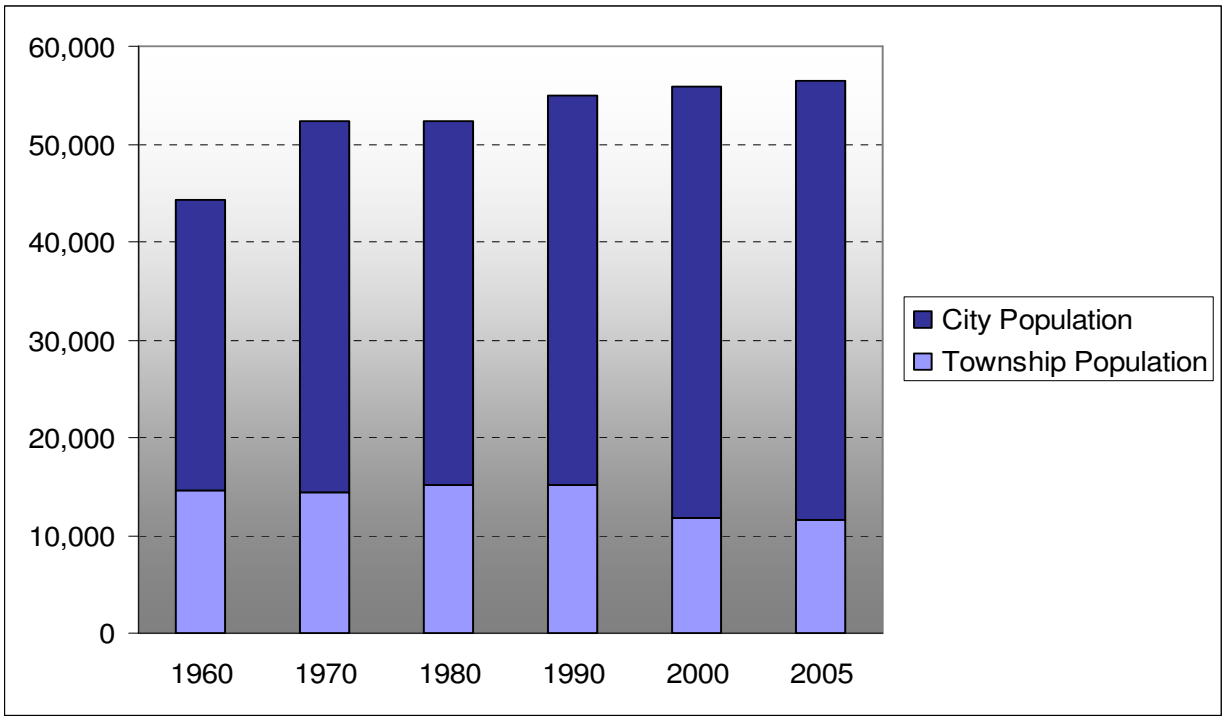
Population

According to estimates from the Minnesota Demographic Center, the County population in 2005 was 58,494. This represents a 4.6 percent increase in population since the 2000 U.S. Census when the County had a population of 55,941. Table 2 shows the population for the cities and township in the County for the 2000 U.S. and for the 2005 estimates from the Minnesota Demographic Center. The majority of the growth in population is from the incorporated cities within the county. In the past forty years the population of the Cities within the County has increased while the population in the unincorporated areas remained stable and started to decrease in 2000. Chart 1 shows population changes between 1960 and 2005.

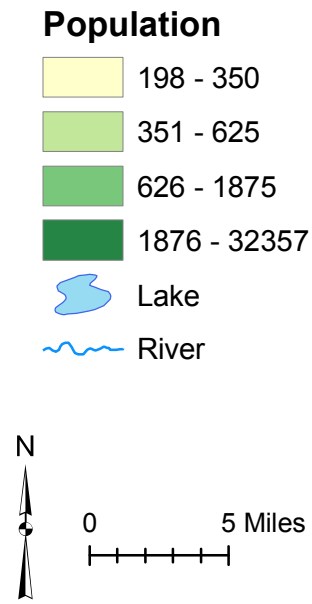
The City of Mankato has seen the most growth in total population since 2000, while Eagle Lake's population grew at a rate of 13 percent compared to 8 percent for Mankato. Madison Lake is estimated to have grown by 8.7 percent and Lake Crystal is estimated to have grown by 5.3 percent from 2000 to 2005. All of the other cities in the County are estimated to have slightly decreasing or stable populations. Jamestown Township and Decoria Township were the only townships growing in population. Portions of Mankato Township were annexed to the City of Mankato explaining the Township's loss of population.

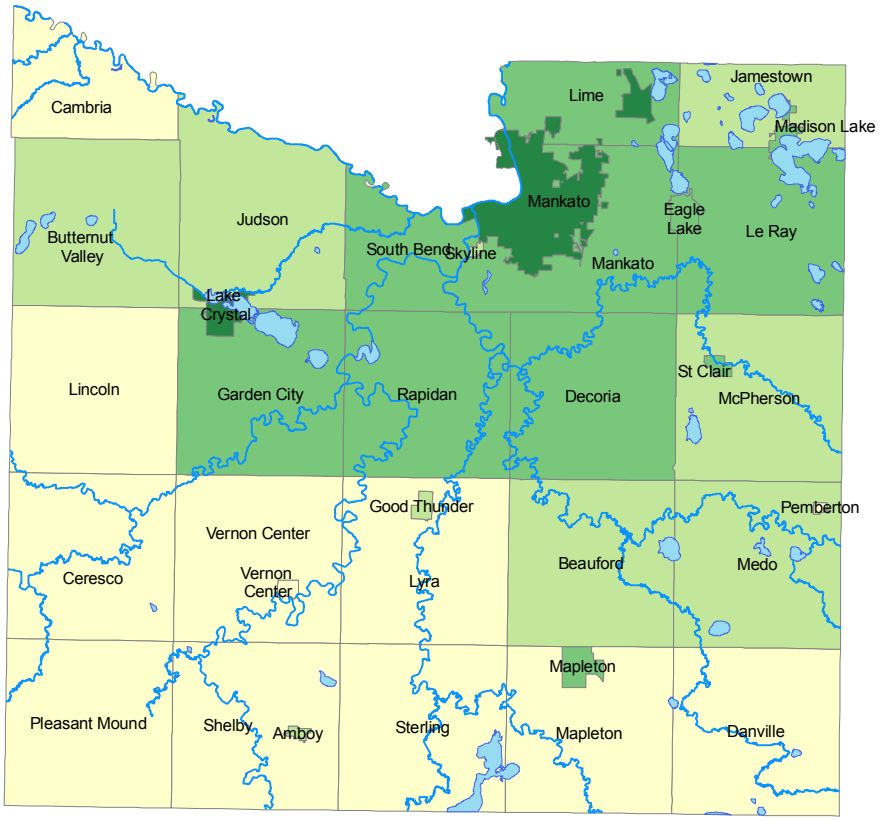
Map 5 and Map 6 and Table 2 show these population changes in each City and Township.

Chart 1. City and Township Population 1960-2005
Source: U.S. Census ~ 1960-2000 population
Minnesota Demographic Center ~ 2005 population estimate



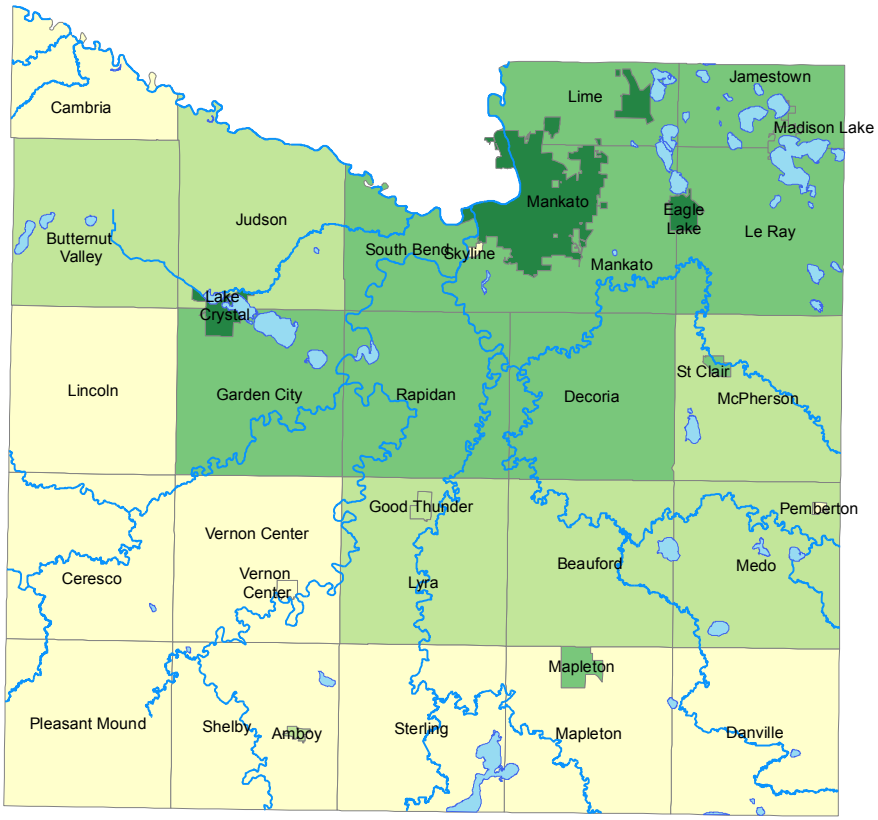
Map 5
2000 Population

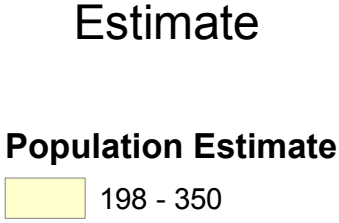


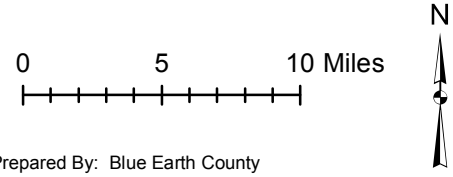


Prepared By: Blue Earth County
Environmental Services
June 2007
Source: 2000 U.S. Census

Map 6
2005 Population Estimate







Prepared By: Blue Earth County
Environmental Services
June 2007
Source: Minnesota State Demographic Center

Table 2. City and Township population 2000 and 2005
Source: U.S. Census ~ 2000 population
Minnesota Demographic Center ~ 2005 population estimate

	2000 Population	2005 Population Estimate	Number Change 2000-2005	Percent Change 2000-2005
City				
Amboy city	575	544	-31	-5.4%
Eagle Lake	1,787	2,020	233	13.0%
Good Thunder	592	563	-29	-4.9%
Lake Crystal	2,420	2,549	129	5.3%
Madison Lake	837	910	73	8.7%
Mankato	32,427	35,031	2,604	8.0%
Mapleton	1,678	1,661	-17	-1.0%
Pemberton	246	246	0	0.0%
St. Clair	827	800	-27	-3.3%
Skyline	330	305	-25	-7.6%
Vernon Center	359	336	-23	-6.4%
City Total	42,078	44,965	2,887	6.9%
Township				
Beauford	442	419	-23	-5.2%
Butternut Valley	382	376	-6	-1.6%
Cambria	271	264	-7	-2.6%
Ceresco	255	244	-11	-4.3%
Danville	262	254	-8	-3.1%
Decoria	922	1,023	101	11.0%
Garden City	700	689	-11	-1.6%
Jamestown	628	643	15	2.4%
Judson	591	557	-34	-5.8%
Le Ray	846	824	-22	-2.6%
Lime	1,314	1,252	-62	-4.7%
Lincoln	227	214	-13	-5.7%
Lyra	378	358	-20	-5.3%
McPherson	470	461	-9	-1.9%
Mankato	1,833	1,775	-58	-3.2%
Mapleton	310	285	-25	-8.1%
Medo	374	360	-14	-3.7%
Pleasant Mound	235	215	-20	-8.5%
Rapidan	1,061	1,037	-24	-2.3%
Shelby	294	281	-13	-4.4%
South Bend	1,491	1,451	-40	-2.7%
Sterling	276	272	-4	-1.4%
Vernon Center	301	275	-26	-8.6%
Township Total	13,863	13,529	-334	-2.4%
County Total	55,941	58,494	2,553	4.6%

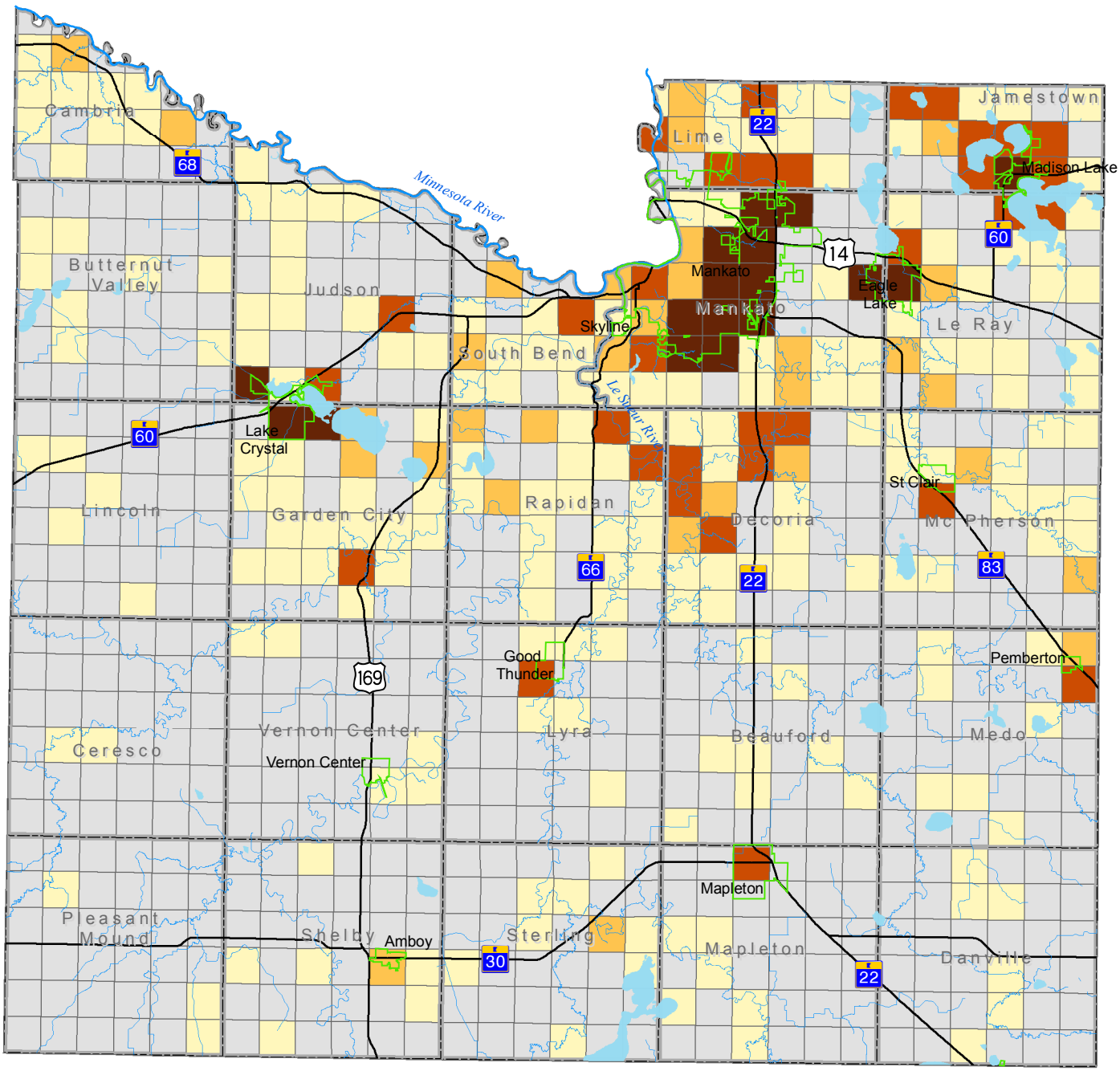
Areas of Growth
The main centers of population growth in the County have been Mankato, Eagle Lake, Madison Lake and Lake Crystal. A great deal of commercial growth has also occurred mainly in Mankato.

Since the Water Plan was updated in 1998, there have been 3,177 single family dwellings constructed in the County. Using the County's Assessor's database and GIS, this information is shown by Section on Map 7. The data includes single family attached or detached houses that have been completed and assessed by the County. Of those houses constructed since 1998, 2,538 or 79.9 percent are located within the municipalities. Sixty-two percent of the all of the houses constructed in the County since 1998 are within the City of Mankato.

Dwellings constructed in the unincorporated areas of the County since 1998 appear to be located generally near the County's rivers, streams, lakes and wetlands.

The current County Zoning Regulations do not allow subdivisions with more than four lots in a quarter-quarter section (40-acres) without being connected to municipal services. Development of previously undeveloped lots in a number of subdivisions created in the 1980's and early 1990's account for much of the residential growth along the County's rivers, lakes and streams since 1998. These subdivisions are located along the Le Sueur River, Maple River, Cobb River, and the lakes in the northeast portion of the County.

Map 7. Houses Constructed By Section Since Last Water Plan Was Approved (1998)



City

Township

Houses Constrcuted by Section Since 1998

- 1 - 2
- 3 - 5
- 6 - 39
- 40 - 361
- No New Houses Constructed

BLUE EARTH COUNTY

Prepared By: Blue Earth County
Environmental Services
December 2007

Source: Dwellings - BEC Taxpayer Services
Assessors Data

Public waters

Minnesota Statutes, Section 103G.005 sets forth criteria for public water basins and watercourses. According to this statute, Public Waters mean:

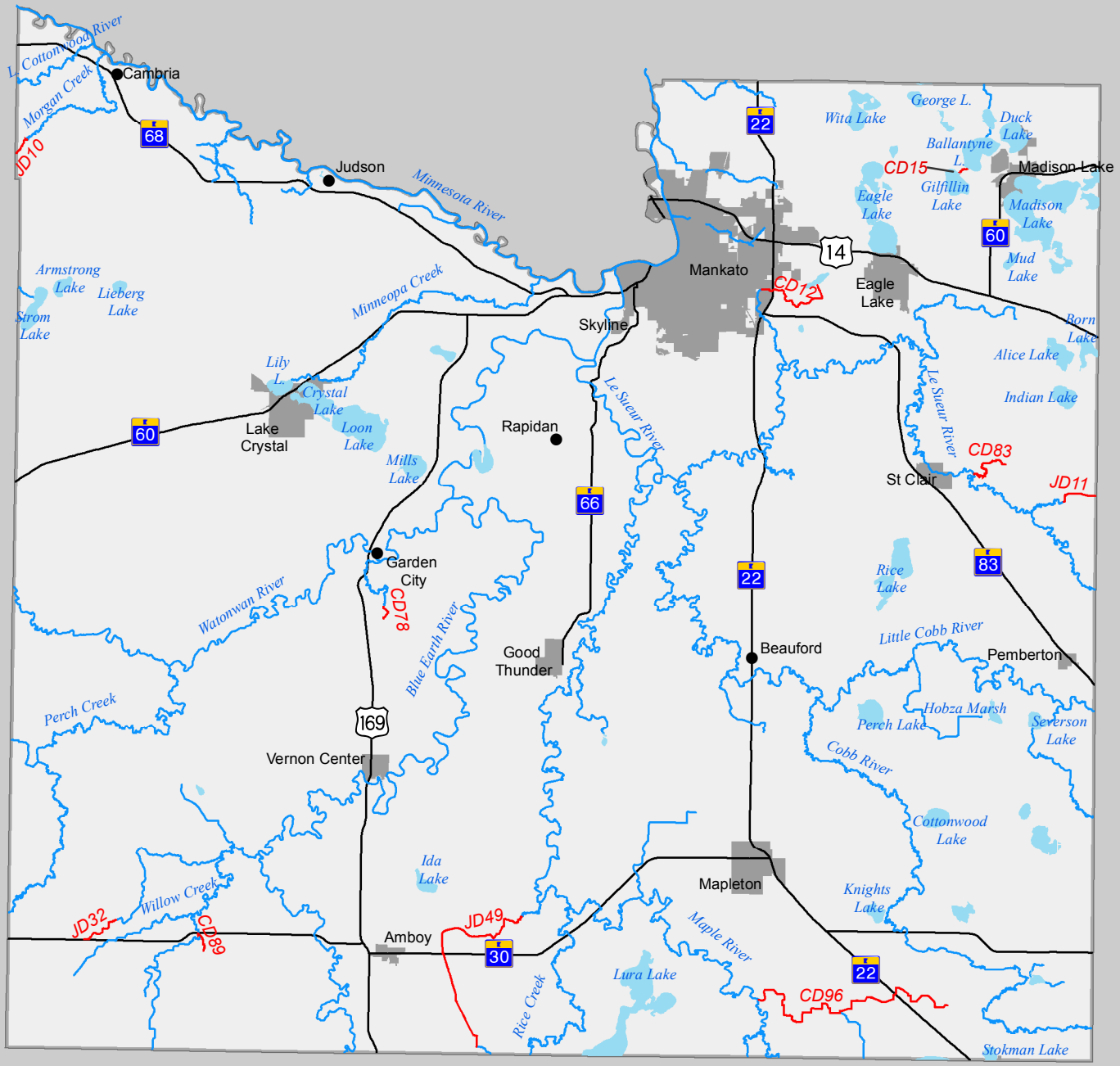
> (1) water basins assigned a shoreland management classification by the commissioner under sections 103F.201 to 103F.221;
> (2) waters of the state that have been finally determined to be public waters or navigable waters by a court of competent jurisdiction;
> (3) meandered lakes, excluding lakes that have been legally drained;
> (4) water basins previously designated by the commissioner for management for a specific purpose such as trout lakes and game lakes pursuant to applicable laws;
> (5) water basins designated as scientific and natural areas under section 84.033;
> (6) water basins located within and totally surrounded by publicly owned lands;
> (7) water basins where the state of Minnesota or the federal government holds title to any of the beds or shores, unless the owner declares that the water is not necessary for the purposes of the public ownership;
> (8) water basins where there is a publicly owned and controlled access that is intended to provide for public access to the water basin;
> (9) natural and altered watercourses with a total drainage area greater than two square miles;
> (10) natural and altered watercourses designated by the commissioner as trout streams;
> (11) public waters wetlands, unless the statute expressly states otherwise.

The DNR oversees these waters and regulates activities below the Ordinary High Water Level (OHWL). Activities such as dredging, filling, excavating, constructing bridges, culverts, or water level control structures are examples that are regulated by the DNR under the Public Waters Program. The DNR maintains a Public Waters Inventory Map.

Protected Waters

Activities above the OHWL of public waters are regulated by the County or municipalities. The Shoreland Section of the County Code identifies the lakes, wetlands and streams which are Protected Waters under County regulations. The Protected Waters in the County Code is nearly identical to the State Public Waters map with the exception of a few Public Water Wetlands that are not listed as Protected Waters in the County Code. Map 8 displays the Protected Waters in Blue Earth County.

Map 8. Protected Streams, Lakes, and Wetlands



- Protected Lake or Wetland
- County Ditch Classified as Protected Water
- Protected Stream or River
- State or U.S. Highway
- City

0 5 Miles

N

BLUE EARTH COUNTY

Prepared By: Blue Earth County
Environmental Services
December 2007

Note: Protected streams, lakes, and wetlands listed in the Shoreland Section of the County Code are shown.

Floodplains

With over 200 miles of rivers and streams in the County, flooding is a concern, particularly related to protection of existing property in the floodplain. Most floodplain development is located in the City of Mankato, Judson Township and Cambria Township. Floodplains in the County are officially identified on Federal Emergency Management Administration's (FEMA) Flood Insurance Rate Maps. Map 9 shows the FEMA-identified floodplains in the County. The majority of the area in the County is covered by Floodplain maps that were last updated in 1990. Maps along the Minnesota River and the confluence of the Blue Earth River were updated in 1999.

Limitations
Detailed Flood Studies were conducted for all areas of the County when FEMA's Floodplain Maps were compiled. Just over two thirds of the land the County which is defined as being in a Special Flood Hazard Area Inundated by the 100-Year Flood is classified as being in Zone A which does not have detailed flood information or elevations for the 100-year Flood.

There have been significant river channel changes since the Floodplain maps were last revised. There are river channels in the County that have changed so much that the river channel itself is now located outside of the Floodplain that was delineated in 1990.

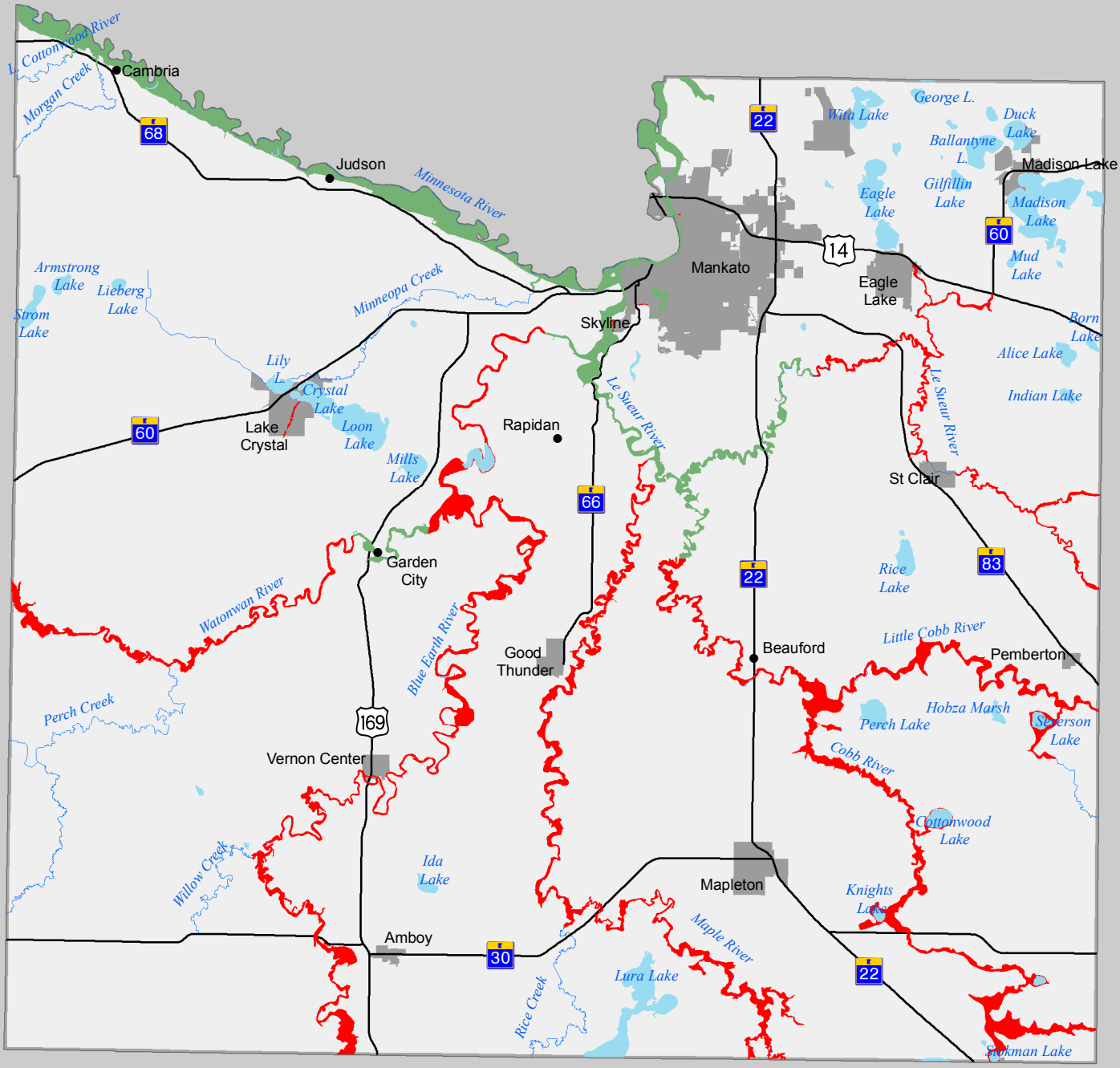
In addition to the lack of elevation data available on the current Flood Insurance Rate Maps, several of the smaller streams and rivers in the County such as Minneopa Creek, Morgan Creek and the Little Cottonwood River only have delineated Floodplain at their confluence with the Minnesota River.

Municipalities, such as the City of St. Clair, which have not chosen to participate in the National Flood Insurance Program, are simply not included in the FEMA Flood Insurance Rate Map. For example, the Floodplain along the Le Sueur River is shown as stopping at the City limits of St. Clair.

Within the City of Lake Crystal, a small area of floodplain has been delineated along County Ditch 56.

FEMA Map Modernization
FEMA is in the process of updating Flood maps nationwide. Digital Flood Insurance Rate Maps for Blue Earth County will be available as part of their map modernization process. The County collected LiDAR high resolution elevation data a high resolution orthophoto in 2005. Both the photo and elevation data have been provided to FEMA and its consultant and are important components in helping improve the quality and resolve the limitations with the current Floodplains that are delineated in the County. FEMA is scheduled to complete Blue Earth County's maps in the next few years.

Map 9. FEMA Floodplain



State or U.S. Highway

City

FEMA Floodplain

Floodplain Without Base Flood Elevations

Floodplain With Base Flood Elevations

0 5 Miles

N

BLUE EARTH COUNTY

Prepared By: Blue Earth County
Environmental Services
October 2007

Source: Floodplain - Federal Emergency Management Agency

Wetlands

Like other counties in Southern Minnesota, the vast majority of the pre-settlement wetlands in Blue Earth County were drained to allow for the production of crops and the development of communities. It is difficult to quantify the loss of wetlands in the County. The DNR's "*Minnesota Wetlands Conservation Plan*" from 1997 estimated that only two percent of the County's pre-settlement wetlands remained in 1981.

For regulatory purposes of the Wetland Conservation Act (WCA), the County falls within a group of counties for which less than 50-percent of the pre-settlement wetlands are intact.

Definition of a Wetland

Minnesota Statutes, Chapter 8420.0010, Subp. 52 defines wetlands as: "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water." It also states that a wetland must:

1. have a predominance of hydric soils;
2. be inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
3. under normal circumstances, support a prevalence of hydrophytic vegetation.

Wetland Inventory

A comprehensive inventory of existing wetlands is not available. The U.S. Fish and Wildlife Service and DNR have inventories of wetlands.

Minnesota Protected Waters: The State Public Waters law, Minnesota Statutes, Section 103G.005, designates some wetlands as public waters, including:

- Water basins are assigned a shoreland management classification, including wetlands. Wetlands less than 80 acres in size are classified as natural environment lakes.
- Water basins designated for management for a specific purpose such as a trout lake and game lake;
- All types 3, 4 and 5 wetlands as defined in U.S. Fish and Wildlife Service (USFWS) Circular No. 39 not included within the definition of public waters, not included in the definition of public waters, that are ten or more acres in size in unincorporated areas or 2.5 acres or more in incorporated areas.

National Wetlands Inventory: The purpose of the NWI was to provide better information on the location and type of wetlands that were shown on the U.S. Geological Survey topographical maps. The NWI was compiled based on interpretation of aerial photos from 1980. Map 10 shows the NWI wetlands in the County. It was not the intent of the NWI to provide exact wetland boundaries and the NWI does not depict all wetlands. Many wetlands under an acre in size and wetlands in areas such as forests where wetlands are not identifiable using photos are not shown on the maps. In Blue Earth County, there are many wetlands that do not appear on the NWI maps for those reasons, and there and also wetlands which are identified on the NWI that are currently farmed or developed. The NWI provides information, but wetland delineations may be necessary when wetland determinations are made under the WCA.

Wetland types

Wetlands vary in depth, flow, proximity to other water bodies and vegetation. The U.S. Fish and Wildlife Service developed a classification of wetlands which includes many types of wetlands, according to *Wetlands of the United States*, U.S. Fish and Wildlife Service Circular 39 (1971 edition). These types of wetlands include:

Type 1 wetlands are seasonally flooded basins or flats in which soil is covered with water or is waterlogged during variable seasonal periods but usually is well-drained during much of the growing season. Type 1 wetlands are located in depressions and in overflow bottomlands along watercourses, and in which vegetation varies greatly according to season and duration of flooding and includes bottomland hardwoods as well as herbaceous growths.

Type 2 wetlands are inland fresh meadows in which soil is usually without standing water during most of the growing season but is waterlogged within at least a few inches of surface. Vegetation includes grasses, sedges, rushes, and various broad-leafed plants. Meadows may fill shallow basins, sloughs, or farmland sags, or these meadows may border shallow marshes on the landward side.

Type 3 wetlands are inland shallow fresh marshes in which soil is usually waterlogged early during a growing season and often covered with as much as six inches or more of water. Vegetation includes grasses, bulrushes, spike rushes, and various other marsh plants such as cattails, arrowheads, pickerelweed, and smartweeds. These marshes may nearly fill shallow lake basins or sloughs, or may border deep marshes on the landward side and are also common as seep areas on irrigated lands.

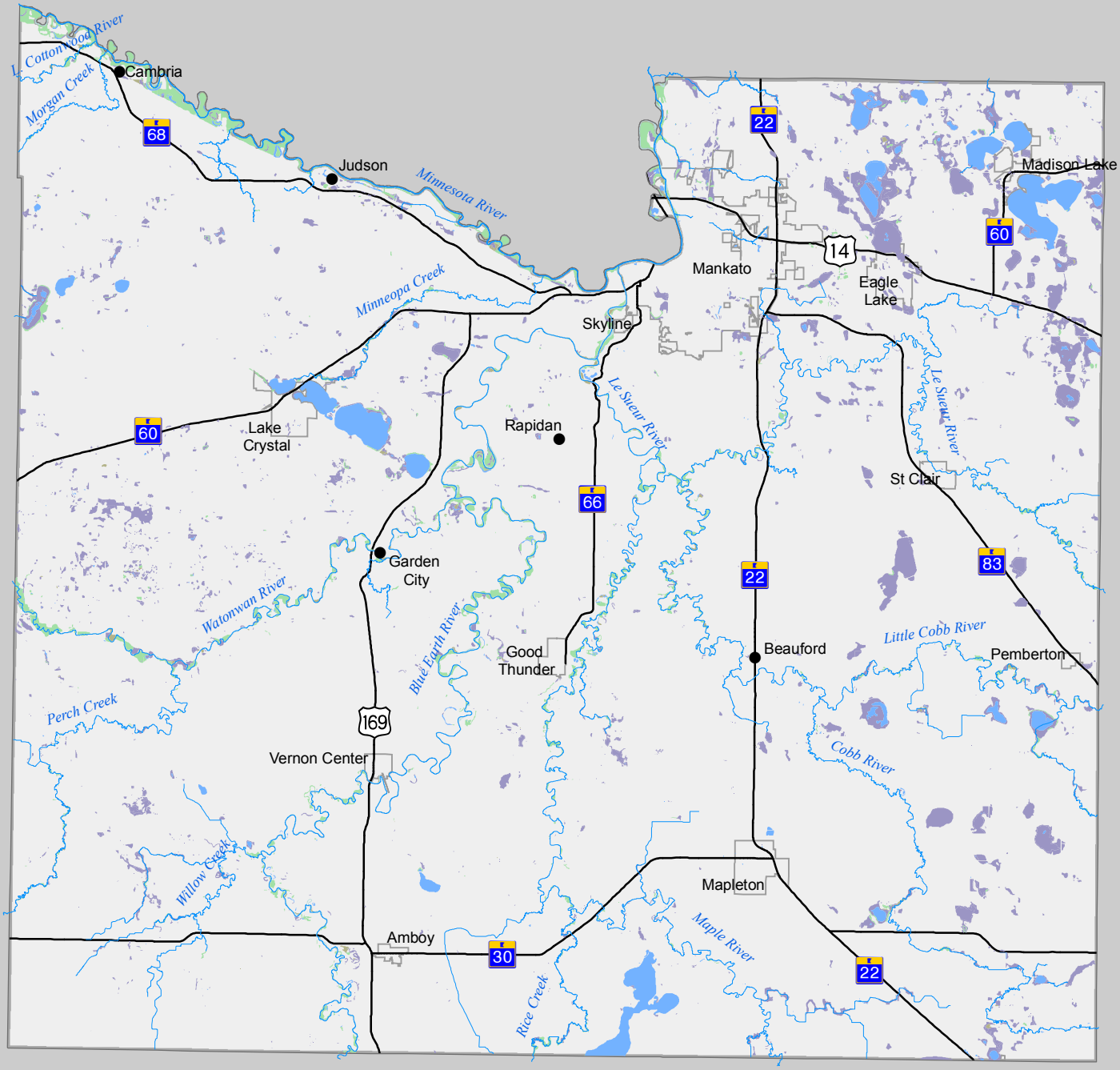
Type 4 wetlands are inland deep fresh marshes in which soil is usually covered with six inches to three feet or more of water during the growing season. Vegetation includes cattails, reeds, bulrushes, spike rushes, and wild rice. In open areas, pondweeds, naiads, coontail, water milfoils, waterweeds, duckweeds, water lilies, or spatterdocks may occur. These deep marshes may completely fill shallow lake basins, potholes, limestone sinks, and sloughs, or they may border open water in such depressions.

Type 5 wetlands are inland open fresh water, shallow ponds, and reservoirs in which water is usually less than ten feet deep and is fringed by a border of emergent vegetation similar to open areas of type 4 wetland.

Type 6 wetlands are shrub swamps in which soil is usually waterlogged during growing season and is often covered with as much as six inches of water. Vegetation includes alders, willows, buttonbush, dogwoods, and swamp-privet. This type occurs mostly along sluggish streams and occasionally on floodplains.

Type 7 wetlands are wooded swamps in which soil is waterlogged at least to within a few inches of the surface during growing season and is often covered with as much as one foot of water. This type occurs mostly along sluggish streams, on floodplains, on flat uplands, and in shallow basins. Trees include red maple, and black ash. Deciduous swamps frequently support beds of duckweeds and smartweeds.

Map 10. National Wetlands Inventory



NWI Wetland Type

- Emergent
- Forested
- Riverine
- Scrub-shrub
- Open Water

- State or U.S. Highway
- City

0 5 Miles

N

BLUE EARTH COUNTY

Prepared By: Blue Earth County
Environmental Services
October 2007

Source: NWI - U.S. Fish and Wildlife Service